

REMARKS

Upon entry of the present amendment, claims 1-2 and 8-17 will remain pending in the above-identified application and stand ready for further action on the merits.

In the instant amendment, claims 1 and 2 have been amended and claims 8-17 have been added.

The amendments made herein to the claims do not incorporate new matter into the application as originally filed. For example, the amendments to claims 1 and 2 are self-supported. Further, the amendments to claims 1-2 are made in order to make the present invention more clear. New claims 8-9 find support at page 4, lines 24-29 of the specification. New claims 10-11 are based on the disclosure at page 4, line 35 to page 5, line 2 of the specification. New claim 12 is based on the disclosure at page 9, line 13, page 11, line 32, and page 12, line 19 of the specification. New claims 13-17, which depend from claim 1, are based on claims 3-7, respectively, which are presently withdrawn from consideration.

Proper consideration of each of the pending claims (i.e., claims 1-2 and 8-17) is respectfully requested at present, as is entry of the present amendment.

Election/Restriction

For the purpose of examination of the present application, Applicants elect, with traverse, Group 1, Claims 1-2. The requirement is traversed because (1) there are overlapping technical features between the two groups of claims and (2) there would be no undue burden on the Examiner to examine both groups of claims.

Further, proper consideration of each of new claims 8-17, which depend from claim 1, is also respectfully requested at present.

Rejection under 35 USC § 102(b)

Claims 1 and 2 have been rejected under 35 USC § 102(b) as being anticipated by Mitsui US '083 (US 6,037,083). Reconsideration and withdraw of each of these rejections is respectfully requested based on the following considerations.

The Present Invention and Its Advantages

The present invention is directed to halftone phase shift mask blanks to be processed into halftone phase shift masks suitable for use in the microfabrication of semiconductor integrated circuits, color filters for charge coupled devices (CCD) and liquid crystal displays (LCD), magnetic heads or the like. The halftone phase shift mask blanks of the present invention (claim1) comprises a phase shifter film composed of a metal silicide compound containing molybdenum (as a first metal component), at least one metal selected from among tantalum zirconium, chromium and tungsten (as a second metal component), and at least one element selected from among oxygen, nitrogen, and carbon, and has the advantage in that the phase shifter film has high in-plane uniformity. Further, the present invention is effective to process by etching, especially dry etching, and has chemical resistance so that it keeps its transmittance or phase difference unchanged when cleaned with chemicals, especially alkaline chemicals.

Further, the present invention (claims 13-16) is directed to a method of manufacturing the halftone phase shift mask blanks. The halftone phase shift mask blanks can be manufactured by

using molybdenum silicide as a first target and at least one metal silicide selected from among tantalum silicide, zirconium silicide, chromium silicide, and tungsten silicide as a second target, and carrying out reactive sputtering in the presence of at least one reactive gas containing at least one element selected from among oxygen, nitrogen, and carbon, while applying an electric power to the first and second targets at the same time, thereby forming a phase shifter film of a metal silicide compound on a transparent substrate.

Distinction over Mitsui US '083

As recited in claim 1, the halftone phase shift mask blank of the present invention comprises a transparent substrate and a phase shifter film thereon, and the phase shifter film is composed of a metal silicide compound containing molybdenum, wherein said compound further contains at least one metal selected from the group consisting of tantalum, zirconium, chromium, and tungsten, and at least one element selected from the group consisting of oxygen, nitrogen, and carbon. Thus, one of the features of the present invention is that the phase shifter film is composed of a metal silicide compound containing both molybdenum (the first metal component) and at least one of among tantalum, zirconium, chromium and tungsten (the second metal component).

However, Mitsui US '083 fails to disclose or suggest “the phase shifter film being composed of a metal silicide compound containing molybdenum, wherein said compound further contains at least one metal selected from the group consisting of tantalum, zirconium, chromium, and tungsten” as recited in the present invention.

The Examiner states, at page 3 of the Office Action, as follows:

"Mitsui discloses... and a half material film such that its main components are a metal, such as Mo, Ta, W, Ti and Cr, silicon, oxygen and/or nitrogen or substance which are mixture of one or more of these compound and may contain suitable quantities of C (column 5 lines 23-65)."

However, Mitsui US '083 fails to disclose and suggest specifically the phase shifter film of metal silicide compound containing both molybdenum (the first metal component) and at least one of among tantalum, zirconium, chromium and tungsten (the second metal component)

For example, Mitsui US '083 discloses in col. 5, lines 23-27 as follows:

"In the case of a single-layer halftone phase shift mask blank, the halftone material film may be made such that its main components are a metal, silicone, and oxygen and/or nitrogen."

Mitsui US '083 merely discloses oxides, nitrides or oxynitrides of only one kind of metal and silicon, and fails to disclose and suggest a phase shifter film, which contains both molybdenum and at least one of among tantalum, zirconium, chromium and tungsten.

Therefore, the present invention (claims 1-2 and 8-12) is not anticipated by Mitsui US '083. Further, the present invention is not obvious over Mitsui US '083 since the cited reference provides no specific motivation to those of ordinary skill in the art that would allow them to arrive at the same.

Further, since the halftone phase shift mask blank of claim 1 is patentable over the reference, claims 13-17, which are directed to a method of manufacturing the patentable halftone phase shift mask blank of claim 1, are also patentable.

Information Disclosure Statement

Applicants appreciate the Examiner's initialed PTO-1449 of the Information Disclosure Statement ("IDS") filed on June 23, 2004.

However, Applicants have not yet received an initialed copy of the PTO-1449 form with regard to the IDS filed on October 7, 2003. Applicants herein submit a copy of the October 7, 2003 PTO-1449 form and respectfully request that the Examiner consider each reference return an initialed copy of the same to the Applicants.

CONCLUSION

In view of the above amendment, Applicants submit the pending application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Gerald M. Murphy, Jr. (Reg. No. 28,977) at the telephone number below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Dated: SEP 29 2005

Respectfully submitted,

By 

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